Intel Developer Update is Intel's monthly online news magazine for developers. As the official publication of developer.intel.com, it brings hardware, software, and Web developers the latest information on initiatives, technologies, platforms, and products based on the Intel® Architecture.

Cover Story

Each month, we run a cover story on the most significant industry announcement, trend, or development for the month.

Featured Articles

Delivering in-depth reports on key platforms, products and technologies, our featured articles provide a monthly source of information on issues affecting developers. Be sure to check in every month for the latest developments driving the evolution of the industry.

Contact the Editor

To make *Intel Developer Update* a better information resource, we invite you to share your thoughts on what we've published or what you'd like to see covered. Comments are always welcome.

Archives

Our archives contain two groups of previously published articles. One group contains all the articles that appeared in *Platform Solutions News*, the earlier version of *Intel Developer Update*. The articles date from September 1997 through August 1999. The other group is set up to contain *Intel Developer Update* articles dating from the inaugural September/October 1999 issue.

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On behalf of all of us at Intel Developer Update, welcome to the future of the PC platform!

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Cover Story

New Processors Significantly Boost Performance and Expand Choices

Jeff Austin
Technology Marketing Manager,
IA-32 Microprocessor Marketing
Microprocessor Group
Intel Corporation

Overview

The newest generation of Intel® Pentium® III and Intel Pentium III Xeon™ processors introduced on October 25 offers hardware and software developers an unprecedented array of processing options that span the desktop, mobile, workstation, and server marketplaces. Almost a dozen and a half new versions of the processor are available, in speeds ranging from 450 MHz all the way up to 733 MHz, with different packaging and front-side bus versions available to meet the needs of each of today's platform computing market segments.

The new Intel processors also provide significant performance increases when compared—at the same frequencies—with previous-generation Pentium III processors. This boost is largely derived from Intel microarchitectural innovations such as the Advanced Transfer Cache (ATC) and Advanced System Buffering (ASB). In addition, all new processor versions benefit from the higher integration and lower power achieved through Intel's 0.18-micron process technology.

Equally significant, the design of the new processors provides substantial headroom for the future, paving the way for succeeding versions of processors to operate at frequencies of 800 MHz and beyond. With Intel's 0.18-micron process manufacturing already in production, the processors—and associated solutions such as the new Intel® 840 chipset for workstation developers and the existing Intel® 810E and Intel® 440 BX chipsets for desktop developers—are now available in high-volume quantities. The accompanying chart illustrates the wide range of processor choices from which developers can choose to create their next generation platform solutions.

Intel® Pentium® III Processor	Core Speeds/Versions				
Features	**733, 667, 600EB, 533EB MHz**	**700, 650, 600E MHz**	**500E, 550E MHz**	**600B, 533B MHz**	**450, 500, 550, 600 MHz**
S.E.C.C.2 Package	X	X		X	X
FC-PGA 370 pin Package			X		
0.18 Micron Process Technology	X	X	X		
0.25 Micron Process Technology				X	X
133 MHz System Bus	X			X	
100 MHz System Bus		X	X		X
256 KB Level 2 Advanced Transfer Cache (full-speed)	X	X	X		
512 KB On-Package Half-Speed Level 2 Cache				X	X
Advanced System Buffering	X	X	X		
Dual Processor Support	X	X		X	X
64 GB Memory Addressibility	X	X	X	X	X
4 GB Memory Cacheability	X	X	X	X	X
Streaming SIMD Extensions	X	X	X	X	X
Intel Processor Number Serial Number	X	X	X	X	X
Dual Independent Bus Architecture	X	X	X	X	X
Dynamic Execution	X	X	X	X	X
Intel® MMX™ Media Enhancement Technology	X	X	X	X	X

Note: "E", "B", and "EB" nomenclature is used to differentiate processors within a processor speed designation when there is an overlap between processor frequencies and functionality.
"E" designates Advanced Transfer Cache and Advanced System Buffering support.
"B" designates 133 MHz System Bus support.
"EB" designates Advanced Transfer Cache, Advanced System Buffering, and 133 MHz System Bus support.

Note: All processors greater than 600 MHz include the Advanced Transfer Cache and the Advanced System Buffering functionality.

Intel® Pentium® III Xeon Processor	Core Speeds/Versions
S.E.C.C.2 Package	X
0.18 Micron Process Technology	X
133 MHz System Bus	X
256 KB Level 2 Advanced Transfer Cache (full-speed)	X
Advanced System Buffering	X
Dual Processor Support	X
64 GB Memory Addressibility	X
4 GB Memory Cacheability	X
Streaming SIMD Extensions	X
Electronic Signature	X
Dual Independent Bus Architecture	X
Dynamic Execution	X
Intel® MMX™ Media Enhancement Technology	X
Integrated Manageability Features	X
On Cartridge Voltage Regulation	X
Future Large Cache Option	X
36 Month Product Discontinuance Policy (Pentium III Processor has 18 Month Product Discontinuance Policy)	X

Performance by Design

The new Pentium III processors provide significant performance improvements over previous-generation Pentium III processors at any given frequency, thanks to the Advanced Transfer Cache enhancements and system bus bandwidth optimizations associated with Advanced System Buffering.

A heavily integrated and highly optimized 256 KB, 256-bit-wide, on-die Level 2 ATC provides outstanding bandwidth—up to 11.7 GB at 733 MHz, for example—while delivering an impressive 4X reduction in Level 2 latency. The cache is organized as an 8-way set associative configuration that, combined with the high bandwidth and lower latency, delivers this increase in cache performance for real applications. In addition, the performance of the Advanced Transfer Cache scales with core frequency.

While a number of the new Pentium III processors are available with 100 MHz system buses, many of the new versions utilize a 133 MHz system bus for added performance. Optimized for 133 MHz operation, Intel's Advanced System Buffering provides a balanced increase in critical buffers, minimizing bottlenecks to allow sustained bandwidth of more than one gigabyte per second on the high-speed system bus. This represents a significant increase over the sustained bandwidth of 680 MB/second provided by previous-generation Pentium III processors.

Designed for frequency scalability, the new processors rely on Intel's 0.18-micron process technology to decrease gate dimensions and improve transistor speed. The addition of another metal layer—the new processors have six layers—for routing density provides for a full-speed integrated Level 2 cache interface. Intel's overall layout and design approach ensures minimal cross-capacitance while optimizing the architecture for future transistor improvement.

In addition to the substantially higher levels of performance that the new Pentium III processor brings, software will soon be able to take advantage of new SSE (Streaming SIMD Extensions) Compiler Technologies from Intel. These new compiler technologies can considerably increase software performance across the Pentium III processor product line. For more information on software development tools, please visit the Intel developer and tools Web site.

Side-by-Side Performance Comparisons

The net result of the latest innovations applied to the new generation of Pentium III processors is a marked improvement in performance that complements the increased choices now available for developers. Compare, for example, an existing III processor with a new Pentium III processor—both running at 600 MHz with a 133 MHz system bus.

In analyzing SPECint_base95 benchmarks, the new design achieves a 12 percent performance increase when compared to its predecessor at the same 600 MHz frequency. This increase jumps to 20 percent when comparing SPECfp_base95 benchmarks, thanks to the new processor family's improved handling of large floating-point data sets. In addition, the old version of the Pentium III processor features memory bandwidth prefetch speeds of 679 MB/second, while the new Pentium III processor features up to 1010 MB/second sustained bandwidth.

Summary

For hardware and software developers alike, the new Pentium III and Pentium III Xeon processors provide excellent opportunities for product differentiation across many different market segments as they ramp into high volume in the fourth quarter—this will be Intel's fastest processor manufacturing ramp to date. To learn more about these opportunities, developers should read the accompanying stories in this issue of Intel Developer Update that explore how the new processors can be employed in the desktop, mobile, workstation, and server vertical market segments.

The new processors and their associated products support Intel's commitment to deliver different processor versions optimized to meet the unique needs of each highly specific and expanding market segment that Intel processors serves today. It all translates into more choices—and more opportunities—for developers basing their solutions on the Intel Architecture.

More Info

For more details and information on the new Pentium III processors, Pentium III Xeon processors and associated platform products, please visit the following Web sites:

- Pentium III processors
- Pentium III Xeon processors
- Chipsets

For the spectrum of processor performance, please visit the Intel(r)Processor Performance Web site.

Author Bio

Jeff Austin is the technology marketing manager of IA-32 microprocessor marketing for Intel's Microprocessor Group, where his responsibilities include managing the release and dissemination of all product and technology information regarding Intel's IA-32 product line. Jeff has been with Intel for five years, and previously served as a field applications engineer providing technical sales and support to Intel customers. Prior to Intel, he spent eight years with Digital Equipment Corporation, most recently working in personal computer product design. Jeff holds a Bachelor of Science degree in electrical engineering from the University of New Hampshire.

Columns

Inside Looking In

The Value of Value

Tim Mostad
Senior Technical
Marketing Manager
Intel Corporation

Column

It seems I've always known what I was meant to do. My mother tells me that when I was three or four I'd spend countless hours "wiring" my clothes dresser by tying strings from knob to knob. I took a short detour on the way to my electrical engineering degree in the form of a political science/economics major in college. I didn't get off course for too long but I learned a few things that connect with my current work. One is the principle that bureaucracy exists to manage scarcity.

These days I run a group that manages the supply of development systems for software developers. Since the number of these increasingly expensive systems is limited, we need some way to unite them with deserving developers.

For lack of a better mechanism, I could create a process so bureaucratic and onerous that only the developers who really, really, really wanted systems would stick with it long enough to get them. What complicates things is that the people who have both a need for leading edge technology and the time for endlessly complicated processes are not professional software and Internet developers, they are the dreaded "college students." "Students" is really a euphemism for anyone with an application that won't directly result in commercially valuable results. In this case, the value is measured in terms of support for Intel's strategic direction.

Strategically speaking, what does Intel want? We want developers to be successful by creating software that follows our product roadmap. At the same time, we want developers to succeed by creating killer products for the new classes of applications those platforms enable. In short, we need developers to write software that both needs and showcases new systems so businesses and consumers will buy them.

In the past we'd simply give development systems and support to developers, creating a kind of developer welfare system. Sometimes we even got good demos from the process, but rarely did it result in commercially viable applications since we often took developers in directions they might not otherwise gone.

We were applying an overly simple solution to a fairly complex problem. Software developers, like everyone else, are just trying to stay one step in front of their competition. However, they're pulled between two competing objectives. The first is to have their products do things that no others can. This means taking advantage of every new feature they can squeeze out of a platform. The other objective is to make money, which means selling as many copies of their product as possible, something they can readily do by designing for the installed base that always the represents the lowest denominator for technology. This means spending a lot of time optimizing new applications for old systems—not at all what we'd like them to do.

These competing objectives create a paradox that Intel wants to help reconcile to the mutual benefit of our company and software developers. We had to find a way to communicate with them that would lead us both to a valuable result. Fortunately, there's a simple solution since the currency of value is money, and money is the universal language.

The answer is not to give something for nothing, but instead to give quite a lot in exchange for just a little.

We will now plan to charge a subsidized price for a development system, and anyone who really wants that system will pay. Conversely, anyone who really can't afford it won't. This keeps away the tire kickers and figurative college students. It also keeps people honest. We know by experience that any company laying out hard cash for systems will track their whereabouts and usage very closely and make sure they're producing more than quotes on the latest Internet IPO. Of course there'll be exceptions. In some start-up companies, cash is even scarcer than college students, and these may be the very companies we want to enable. In those circumstances we have other types of value proposition we can apply. Still, the key is to always find value.

The old approach of subsidizing developers didn't always fail to get results. It just failed to determine with whom we were most likely to succeed.

The new approach works because the common denominator for supply and demand equation is value. It also applies nicely to training events and other situations where demand could easily outstrip supply. As painful as it is for you to pay money to get a development system or take a class, consider the time you save by avoiding a bureaucracy. I won't claim you'll get off simply by handing us a check. We're offering early systems and early information so there's legal rigor to ensure that expectations and responsibilities are clearly set for both parties in the deal. And there's a bit of sweat equity involved. However, this method is far preferable to the open ended process it could be.

Developers who need tools to get their jobs done value what we have to offer, and they prove it by paying for an advanced development system. We value their commitment to creating software that needs our platforms, and we show that by subsidizing the system to keep it affordable. This mutual exchange will be even more important as we start supplying IA-64 systems that cost many times more than mainstream PCs.

It's been a long time since I was four, but I'm still connecting things, not with string these days but with value. Now at least I can get my sock drawer open.

Author Bio

Tim Mostad continues to pursue technical marketing nirvana by applying his 19 years of Intel hardware experience to extending Intel's influence with software and Web developers. In his work with the Intel® Architecture Content Group, Tim focuses on the development of broad and efficient enabling processes and infrastructure, primarily through use of the Internet.

From the Editor

Donna Loveland
Managing Editor
Intel Developer Update Magazine
Intel Corporation

Column

Any way you look at it, this week's introduction of Intel® Pentium® III and the Intel® Pentium® III Xeon processors based on advanced Intel® 0.18 micron process technology is a very big deal.

In sheer number of parts, we're talking about 15 new Pentium III and Pentium III Xeon™ processors. When you take new features—and the span of design choices—into account, you'll see how huge this introduction truly is.

Since all 15 processors are now available in volume, we know you'll want to get a solid understanding right away. To make it easier for you to sort out the information that accompanies a launch of this magnitude, *Intel Developer Update* is delivering it by market segment.

Turn to this month's cover story for an overview from a processor perspective. For details on what these new products mean to developers working in desktop computing, mobile products, servers, and workstations, visit IDU's departments for articles specific to each area.

While you're there, be sure to check out the stories on other innovative Intel activities. We have the latest on the royalty-free baseline spec just announced by the Advanced Television Enhancement Forum (ATVEF), a look at how the current ATX 2.03 specification is being extended for the next generation of PCs, and a communication appliance reference design you can use to shave months off the development cycle.

Speaking of innovation, would you like to help decide the next series of books coming out of Intel's publishing house, Intel University Press—maybe propose something on 0.18 micron processors? If so, we have an article that tells you how to get involved as a Customer Adviser, an opportunity that's unprecedented in technical publishing.

When it comes to moving the computing industry forward, it doesn't get much bigger than being involved in Intel® product development. We welcome you to read on… and join in.

Author Bio

Donna Loveland is the editor of *Intel® Developer Update*. She joined Intel's Platform Marketing group earlier this year as the editor of *Platform Solutions News*. Donna began her high-tech career with Intel in 1982 as a technical editor in an advanced microprocessor development group. Since then, she's held technical and marketing positions related to leading-edge technologies in areas ranging from stereoscopic display to digital broadcast to scalable online content. She holds a BA degree in English from the University of Rochester and an MA in Expository Writing from the University of Iowa.

Departments

Applied Computing

Time-to-Market Reference Design

Bill Galles
Technical Marketing Manager
Applied Computing Products Division
Intel Corporation

Overview

Some people call them “communication appliances.” Others prefer the term “network-attached appliances” or “Internet appliances.” Whatever name you choose, the networked device market segment provides some outstanding opportunities for developers. The big prerequisite is that you need to be ready to integrate fast time-to-market computing solutions tailored to specific user needs.

To help you meet these requirements, Intel is providing a communication appliance reference design to simplify the time-to-market development of a variety of communication appliances. The reference design includes an Intel® Celeron™ processor-based design with schematics, other design collateral and documentation.

You can use the reference design to shave months off the development cycle, while designing long life cycle network products whose price and performance scales to specific market segments.

Design Considerations

Today’s network appliance market segments scale all the way from telcos, large Internet service providers, and enterprise networks at the top all the way down to price-sensitive small-office/home-office (SOHO) applications typically operated by users who do not have a lot of network technical knowledge.

With the communications appliance reference design, Intel’s Applied Computing Products Division (ACPD) is making extended-life cycle Intel-based solutions available for the first time to network appliance developers. The Intel® Architecture platform supports the same software stack across a wide spectrum of design requirements:

- Basic systems based on the Celeron 300A processor for home servers and residential gateways.
- Value systems based on the 433 MHz Celeron processor for small business.
- Performance systems based on the Intel® Pentium® III processor for enterprise application servers and NAS (network attached storage) appliances.

Application subsets include:

- Network Attached Storage (NAS) appliances.
- Rack-mountable high-performance application servers, such as Web cache engines and load balancers, designed to enhance network performance.
- Full-featured, yet low-priced servers for small business and home use.

Intel® Architecture platforms provide the right combination of high-performance computing capability, LAN connectivity, support for application software stacks, and high levels of reliability. They are an excellent choice for “headless” network-embedded devices such as NAS devices, SMTP/POP mail servers, virtual private networks, and network security systems.

Hardware Requirements

In addition to price/performance flexibility and scalability, network appliance hardware platforms must meet specialized requirements:

- Low-profile form factor targeting chassis of 1.75 inches in height
- High levels of reliability, including thermal design, power supply, built-in surge protection, and failure reporting over the network
- Extended life cycle support, ranging from 5 to 10 years
- Connectivity including USB, Ethernet, POTS (Plain Old Telephone Service), and RS-232 to enable PC-based programming of a “headless” embedded network appliance
- Power in the range of 30 to 40 watts, for efficiency in devices that are always-on.
- Large storage capacity

Intel’s communications appliance platform design includes the following hardware building blocks:

- Intel Celeron 300A processor
- Intel® 440BX PCIset (including both northbridge and southbridge chips)
- One 32 Mbyte SODIMM
- Two 10/100 baseT Intel® 82559 Ethernet controllers
- Two USB ports
- One RS-232 com port to enable programming from a client PC
- One 10-Gbyte hard disk
- Six OEM-definable LEDs
- Four pre-defined LEDs
- One PMC Slot

Summary

There is a growing demand for new devices that can speed up and simplify the acquisition and distribution of Internet data by end users. To be successful, these devices must be designed with the right mix of price and performance and must scale seamlessly into the market for networked appliances.

Intel’s communications appliance reference design can help you meet these goals by eliminating months from the development cycle and letting you focus your resources where they belong: on software development and product definition.

More Info

Intel® Platform Solutions

Author Bio

Bill Gallas began his career at RCA laboratories in 1982 and joined Intel in 1988 as a technical marketing engineer. His responsibilities include processor and chipset support, customer support as well as field engineering support. In the Applied Computing Products Division at Intel, he has worked with embedded Intel architecture from the 80386 to the latest Celeron processors. Presently Bill is driving initiatives designed to shorten time to market for Web and communication appliances utilizing Intel's advanced processors and chipsets. Bill has been granted one patent on advanced packaging design.

Desktop

Expanding Choices on the Desktop

Matthew Nees
Business Platform Launch Manager
Desktop Products Group
Intel Corporation

Overview

On October 25, Intel introduced 15 new Intel® Pentium® III and Intel® Pentium® III Xeon™ processors designed and manufactured with Intel's 0.18-micron process technology. Nine of the new processors are targeted specifically for the expanding desktop market segment. When combined with Intel's existing half-dozen versions of the Pentium III processor based on 0.25-micron technology, the new processors provide desktop platform developers with an unprecedented array of price/performance processor options.

Along with Intel's 0.18-micron process technology, the new Pentium III processors for the desktop all share innovative features such as a 256 KB Level 2 Advanced Transfer Cache (ATC), Advanced System Buffering (ASB), and Streaming SIMD Extensions. These features are described in more detail in the cover story of this issue of *Intel Developer Update*. Together, they combine to significantly boost the performance of the latest generation of processors when compared to their 0.25-micron Pentium III predecessors at the same frequencies—and at virtually the same costs.

The main differences to be found among the new processors relate to their processor frequencies, system bus speeds—either 133 or 100 MHz—and packaging options. Different versions of the processors spread across these feature categories provide developers with a wide range of optimized price/performance platform solutions. In combination with Intel's existing Pentium III and Celeron™ processors, the new Pentium III processors help to meet developer needs across all segments of the desktop market, including entry-level systems, consumer and mainstream business computers, and today's state-of-the-art, high-performance desktop systems.

A Developer's Dream

While the Intel® Celeron processor in its variety of speed versions remains the processor of choice for developers creating value PCs, the new Pentium III processors based on 0.18 micron process technology are targeted to meet the needs of the professional power user and mainstream computing segments of the desktop market.

Professional power user platforms require the highest available performance and headroom to run advanced operating systems and demanding applications that incorporate 3D graphics, streaming media, and other robust technologies. The 733 and 667 MHz versions of the new Pentium III processors—both with a 133 MHz system bus—are ideal for platforms at this highest rung of the desktop computing ladder. The new 700 and 650 MHz Pentium III processors can also be employed in today's high-performance platforms.

The 650 MHz, 100 MHz system bus version of the new Pentium III processor is also a good high-end choice for mainstream platforms, which run the mainstream applications and operating systems prevalent in the industry today. Other new 100 MHz system bus Pentium III processors targeted at mainstream platforms include the 600E and 550E MHz versions. And moving up the performance ladder to the 133 MHz system bus, the new 600EB and 533EB MHz versions of the processor join their power user 733 and 667 MHz counterparts to provide excellent price/performance choices for mainstream platform developers.

New Form Factors

Each of the processors already discussed is available in an S.E.C.C. 2 package. In addition, Intel has introduced two versions of the Pentium III processor—the 550E and 500E, both using a 100 MHz system bus—optimized for the new small form factors now beginning to appear on the desktop. These two versions are available in Flip Chip Pin Grid Array (PGA) packages whose small size and excellent thermal performance pave the way for smaller and cooler motherboard and system form factors, enabling developers to create desktop systems that are more ergonomically refined and easier to use.

All of the new processors can be used in conjunction with a variety of Intel® chipsets to enhance platform performance and functionality. Spanning system bus speeds from 66 MHz up through 133 MHz, the SDRAM-based Intel® 82440BX, Intel® 810, and Intel® 810E chipsets—soon to be joined by the RDRAM-based Intel® 820 chipset—provide developers with a wide range of platform solutions for building their next-generation systems. For desktop users everywhere, those choices ultimately translate into a greater variety of desktop platforms, at a wider range of performance and price points, than ever before.

More Info

For more information on the new Intel Pentium III processors for the desktop platform, please visit the following Web sites:

- Intel Pentium III processor
- Datasheet
- Press Release

Author Bio

Matt Nees is the business platform launch manager for Intel's Desktop Products Group, where his responsibilities include developing the positioning messages for Intel's processor and chipset desktop platform products. In his four years at Intel, he has also worked as a networking territory manager for the company's reseller channel organization. Matt holds a Bachelor of Science degree in business administration from Oregon State University.

Initiatives and Technologies

Building a Chassis for the Next Generation

Bill Colson
Technical Marketing Manager
Intel Architecture Labs
Intel Corporation

Overview

While the next generation of IA-32 and IA-64 processors promises to raise the performance ante and overall user experience of PCs, workstations, and server products, chassis and power supply vendors face a dilemma. That's because the majority of ATX chassis and power supplies in use today will not be sufficient to accommodate the power supply, thermal, acoustic, and electro-magnetic interference (EMI) issues associated with the next generation of processors.

To begin with, current power supply designs use too many components and moving parts (internal fan) to be efficient or cost-effective enough for application in the 2001 performance PC. Thermal and heat dissipation problems also exist, due to the fact that today's commodity fan heat sinks begin to break down over 750 MHz, and are completely unsuited for cooling processors over 1 gigahertz (GHz) processors that will be introduced in the next few years. While some expensive fan heatsinks can possibly cool a processor over 1 GHz, the active solution with the associated higher cost simply doesn't make sense with the thermal solution of ducting available today. In addition, today's chassis and venting implementations cannot hope to handle the increased EMI that will be generated by faster processors and memory buses, the latter of which will soon run at clock speeds of up to 200 MHz.

Help is on the way. The Intel® Architecture Labs (IAL) is now working to extend the current ATX 2.03 specification in ways that will address the power supply, thermal, acoustic, and EMI issues related to the 2001 Performance PC. As a result of these efforts, chassis and power supply vendors will soon have the guidelines they need to develop their next generation designs.

Power to the PC: The NPSA Solution

The key to solving the power supply unit (PSU) dilemma lies in finding a way to get more wattage out of tomorrow's power supplies, while at the same time shrinking the PSU form factor. IAL is developing a New Power Supply Architecture (NPSA) to achieve these goals. While today's conventional PS/2 power supplies are about 55 to 65 percent efficient, NPSA-based power supplies will improve efficiency to 80 percent, delivering the capacity to support next generation Intel processors while also achieving significant cost savings.

With NPSA, for example, conventional PS/2 designs can shrink down to the smaller size associated with today's SFX power supply form factor. This will yield an SFX power supply capable of generating 250 watts, at a cost 35 percent lower than what would be entailed using a larger PS/2 design at the same wattage level. In addition, the Power Factor Correction technology in place today can be included in an NPSA-based PSU at no extra cost. And NPSA provides for more efficient and accurate voltage regulation especially at lower voltages and large current demands for the next generation Intel processors and chipsets.

The reason the smaller SFX form factor will be feasible for the next generation of power supplies is that NPSA reduces the number of internal components in the PSU. These components, in turn, will be required to handle fewer AC-to-DC conversion stages. NPSA's efficient conversion eliminates the need for internal PSU fans, enabling the power supply and the overall system components to be cooled by a single integrated 120-mm system fan in the next generation chassis. This approach represents a significant improvement over the three 60-mm fans—or in some cases, two 80-mm fans—used for system cooling in today's high performance (and loud) ATX chassis designs.

Thermal Design

The IAL's ATX chassis development efforts are also geared toward meeting the thermal challenges posed by the next generation of processors. The biggest change in this area is the use of a single fan to handle all system cooling requirements. Today's ATX chassis typically has one fan in the front and optionally another fan in the back in addition to PSU fan and fan heatsink. The new ATX design uses a single fan that pulls air from the back of the chassis and ducts it downward onto the core logic of any PC baseboard comprising of the processor, chipset, memory, and graphics components. This implementation eliminates the need for expensive fan sinks while creating a better airflow throughout the chassis to keep the other system devices (HDD, DVD, CD-ROM, etc.) cool.

Other innovations are also helping to solve next generation PC chassis thermal problems. One of these is the use of High Aspect Ratio (HAR) folded fin or micro-forged heat sinks with heat pipes designed to accommodate the thermal needs of all of the system's core components. A new power connection could be defined which reduces cabling to the baseboard and integrates with NPSA to provide a smooth migration path from ATX 2.03 to the new power supply architecture. Via-in-Pad/Planes-on-Outer Layer (VIP/POOL) printed circuit board manufacturing techniques also improve thermal, EMI, and power delivery characteristics while at the same time eliminating unnecessary PCB layers.

A Matter of Magnesium

IAL is also making excellent progress in working to solve potential EMI problems related to the 2001 performance PC. One innovation of note entails using a magnesium rear panel for the chassis, as opposed to the sheet metal rear panels now being employed. Developers have always recognized that magnesium provides superior EMI protection when compared to sheet metal; the problem to date is that magnesium is slightly more expensive. Intel has designed special features that alleviate this problem, resulting in a substantial improvement in EMI area with wave guide "beyond cut-off" and U-Seam features. Wave Guide Beyond Cutoff techniques can be used to improve air venting and lower air resistance into the chassis while preventing an EMI issue inherent in some ATX chassis designs.

The result is a more accurate dimensional structure for I/O brackets and shields, as well as a more flexible molding process compared to standard stamped parts.

Electromagnetic interference prevention is also improved through the use of a new chassis-dependent connector block, which delivers better EMI protection through integrated shielding and the ability to add EMI filtering. The new connector block implementation also provides a potential system board real estate savings of 2.25 inches in the core layout area, while significantly promoting ease of use in the next generation of PC chassis designs.

Summary

IAL plans to release guidelines for extending the ATX specification by mid-November, with the goal of securing approval and adoption throughout Intel over the course of the next few months. The proposed guideline referencing the ATX infrastructure maintains the microATX, ATX, and extendedATX baseboard form factors into a chassis enclosure. Heavy emphasis on fit, thermal, structural, EMI, and acoustical requirements and other industry solutions surrounding the current SSI and ATX specifications will be apparent. In addition, Intel is working closely with key system OEMs such as Compaq, Hewlett-Packard, Gateway, and Dell to refine the guidelines.

Meanwhile, chassis and power supply vendors are urged to work with Intel in preparing their next generation products to resolve the power supply, thermal, and EMI issues that loom ahead with the advent of faster and more powerful processors. That's because no processor—no matter how advanced its performance may be—can hope to find a home in the PCs, entry-level workstations, and entry-level servers of tomorrow without corresponding advances in the technology used to house it inside the computer system. Thanks to the combined efforts of IAL and the development community, however, enhancements to today's ATX and SSI standards will enable chassis, power supply designs, and other platform technologies to continue to deliver rich, cost-effective benefits in tomorrow's computer systems.

More Info

For more details and information on the Intel Architecture Labs and its efforts to extend the ATX specification to accommodate the next generation of IA-32 and IA-64 processors, please visit the following sites:

- Intel's Scalable Platform
- ATX
- SSI

Author Bio

Bill Colson is a 15-year Intel veteran. In his role as marketing manager for the Intel Architecture Labs, he is responsible for overseeing a wide range of platform architecture technologies. Bill holds a patent in the area of server management and is a member of the IEEE and Next Generation I/O Forum. Bill has written articles for *EE Times* and *Electronic Design*. He has presented at numerous industry forums and tradeshow events. Bill holds a BS in computer systems engineering and electrical engineering from the Oregon Institute of Technology.

Intel Invites Developers to Guide Book Publishing

Rich Bowles
Program Director and Publisher
Intel University Press
Intel Corporation

Overview

In research studies, developers agree: while Web sites are convenient sources of news and information, printed books remain invaluable for their thorough treatment of design matters and their convenience. Developers also value books written by experts on the subject—fellow engineers.

Intel® University Press (IUP) is a new publisher of technical books with a planning approach atypical of the publishing industry. Our book development methods mimic the product development processes of other Intel products. To decide what to publish, IUP invites developers throughout the world to express their needs and become Customer Advisers.

This article tells more about our focus and how you can take the unprecedented opportunity to determine what books this major new technical publisher will print.

Intel University Press Emerges

Intel University Press (IUP) was first mentioned in an executive keynote at the Intel Developer Forum a year ago. At the Fall '98 Conference, Intel President Craig Barrett indicated our vision of providing the industry with information critical to innovating Intel® Architecture-based products and better managing computing infrastructure. This past September, Intel Vice President Pat Gelsinger showed our first book, hot off the presses. The developer community responded enthusiastically. In fact, within two weeks of publication, IUP's first book, *USB Design by Example* by John Hyde, was sold out at Amazon.com and has since been one of their top 0.1 percent most frequent titles sold on that site.

Why did Intel start IUP? A quick look at the world of technical books explains it all.

Computer book publishing in the early '90s was strongly consumer-oriented, with "…For Dummies*" books gaining favor around the world. When online bookstores took off, the focus on consumers became stronger still. As a result, books for professional developers fell into decline, both in number of titles available and timeliness.

At the same time, professional developers craving expert data were asking Intel for more (and more) extensive material about our technologies and products. Recognizing the need to support developers, Intel created an alliance with long-standing publisher John Wiley & Sons, as announced at IDF in February. This arrangement enables Intel to publish key technical information about Intel Architecture with great timeliness by using Wiley's well-established distribution infrastructure.

Intel University Press intends to be a leading supplier of timely, in-depth information in for developers, and the early response to our first book is very encouraging. What could be better? Everything… by taking our book content planning to a new level.

User-driven Content Development

The success of the USB book owes largely to careful research and planning, *plus* input from target users. Surveys, focus groups, and score of discussions with developers told Intel what new information was most needed. At this past IDF, we expanded our ability to interact with the industry by launching a new Web site that shows some of the products we're developing.

Response was so enthusiastic we've made this our standard method. In fact, we're now announcing that *customers* will guide IUP content development. With your input, we can deliver the right information at the right time. And this will also help us avoid "churning topics"—spinning the same information over and over instead of seeking out fresh material.

Customer Advisers Give Advice, Get Rewards

To give individuals in our industry a way to voice their needs and wants, see the Intel University Press Web site. Of course the site includes information about IUP overall and lists our upcoming books. More importantly, though, it's the place where visitors have two ways to influence our plans for content development.

For quick input to us, there's the Developer Survey, a brief list of check-offs and open-ended questions.

To have a greater influence on our editorial strategy, computer system developers and system managers may also register as a Customer Adviser.

How do Customer Advisers steer our direction? After registering on the site, Advisers may critique our new content while it's in development and offer feedback. We also plan to offer our Advisers free copies of IUP books as well as other technical books already in print. Advisers will let IUP know what they think works—or doesn't—and then keep the books they review. As with computing product development, IUP is confident that when professionals consult with other professionals, the results are bound to be solid and worthy of publication.

Summary

Intel University Press takes a developers approach to publishing expert technical information. We are seeking editorial direction from computer developers (hardware and software) and system management professionals, and encourage them to give an assessment of our work in progress. By registering at IUP's Web site, you can offer various levels of opinion, ranging from simple surveys about your needs to manuscript reviews of our projects.

More Info

To find out more about Intel University Press, please visit our Web site and the specific pages below:

- Learn how to become a Customer Adviser to Intel University Press
- Take a quick survey and register your opinion about what IUP should publish
- Review and provide feedback on books currently in development:
  - Introduction to the IA-64 Architecture: Application Programmer's Reference Manual
  - Software Application Developers Guide to the Intel® Pentium® III Processor
  - Programming with OpenMP: An Introduction for the Overworked Software Developer

Author Bio

Richard Bowles is the founding publisher and program director of Intel University Press. He has over 12 years of Intel tenure and has served in a wide variety of market, product, and sales development capacities. Since rejoining Intel in 1993, Richard planned and directed the initial phase of Intel's recent, successful market development efforts in the workstation arena.

Richard has held senior marketing and general management positions at Hewlett Packard and Tektronix and has also consulted in market development to several start-up and Fortune 100 companies during his more than 20 years in the electronics industry. He holds a Bachelor of Science degree in mechanical engineering from Stanford University and has completed post-graduate studies in engineering management at Stanford.

Tuning-in to Enhanced TV

Steve Darrough
Senior Technical Marketing Engineer
Home Products Group
Intel Corporation

Overview

The Advanced Television Enhancement Forum (ATVEF) is a unique alliance of companies from the broadcast, cable, television transport, consumer electronics, and PC industries. ATVEF's role is to specify the use of existing standards for enhanced TV content. Once ATVEF-compliant enhanced content is written, it can be delivered over analog or digital terrestrial, satellite, and cable systems. Consumers can receive the enhanced content on any compliant receiver, including a set-top box, digital TV or PC. This eliminates the need for content creators to develop multiple versions of their programming.

In September, the ATVEF announced the availability of a royalty-free baseline specification built on familiar Internet technologies. These include HTML 4.0, ECMAScript, and Multicast IP, with extensions that enable receivers to recognize and view enhanced content. The specification makes it easy to incorporate pre-existing Web and broadcast content, which will further simplify development.

Enhancing TV Content

It is an inescapable fact that the Internet has been “attracting eyeballs” from TV. With its Intercast® technology, Intel pioneered the development of video plus data (V+D) technology with analog broadcasts. During this effort, Intel conducted consumer research that demonstrated a strong viewer preference for greater interactive content with TV programming. Inserting data content into the video stream provides a great way for broadcasters and content creators to enrich program content and engage viewers in the TV experience. Clickable access to sports statistics, recipes, and all sorts of interesting information can be added to enrich content, not to mention the compelling advantages of direct viewer responses to advertising messages. The evolution of enhanced TV technology has yet another benefit for the industry. It provides a compelling reason for consumers to make the transition to digital television.

Defining the Spec

Early on, Intel used Intercast technology to demonstrate the practicality of analog-based interactive TV. As Intel became involved in the effort to extend the value of Intercast technology to digital broadcast, it became abundantly clear that a baseline specification was needed to define the insertion of data into the video stream. This would provide content creators, TV broadcasters, the cable and satellite industries, and the consumer electronics industry with a single reliable standard for enhanced TV. Fortunately, robust and well-understood Internet technologies already exist, providing a ready-made foundation for enhanced TV. Intel and 13 other companies have worked together to create the ATVEF specification version 1.1. This cross-industry specification defines the fundamentals needed to create HTML-enhanced television content so that it can be reliably broadcast across any network, to any compliant receiver.

Receivers and Networks

The specification lists the minimal content support requirements for compliant receivers. It is important to note that the specification does not limit what content creators can send. It merely provides a common set of capabilities that enable authors to write content once and play it on the maximum number of players.

ATVEF also aims to provide a single solution that will work on a variety of networks. ATVEF content is capable of running on both analog and digital video systems, or even networks with no video at all. The specification supports transmission over terrestrial broadcast, cable and satellite systems, and of course, the Internet. In addition, ATVEF is designed to provide a bridge between networks, such as allowing data on an analog terrestrial broadcast to bridge to a digital cable system. To achieve this goal, ATVEF uses a transport-independent content format. IP (Internet Protocol) is the reference binding, which defines how the transport specifications are encoded.

Transports and Bindings

The ATVEF 1.1 specification defines two transports, one for broadcast data and one for interactive data sent from the receiver through a return path. While the ATVEF spec can run on any video network, a complete specification requires a binding to each individual video network standard for true interoperability. The ATVEF specification includes two bindings, the reference binding to IP and the NTSC binding, which is provided as an example. The IP binding was selected as the reference binding because it provides a complete example of ATVEF protocols and because most networks support the IP protocol. The NTSC binding is a good example of an ATVEF binding to a specific video standard. The ATVEF organization is not a standards body, and does not define bindings for all video standards. The position of the ATVEF is that bindings for each video standard (including PAL, SECAM, DVB, ATSC, and others) should be defined by the appropriate video standards body.

Existing Web Standards

For content developers, the specification defines the content support required for compliant receivers. It's worth pointing out that different content types can be sent over ATVEF transport, including HTML, VRML (Virtual Reality Modeling Language), Java* or data files. When a broadcaster wants the enhanced content to play on the most receivers, the data should meet the ATVEF baseline specification. However, there may be some cases when a creator wants to match content to the specific capabilities of a receiver. In such cases, the data can be transmitted over transport media outside the ATVEF specification.

One of the outstanding strengths of the ATVEF specification is that it is built on already familiar and thoroughly understood Web standards. The specification requires support for the following:

- HTML 4.0 (Hypertext Markup Language)
- CSS 1 (Cascading Style Sheets)
- ECMAScript (standard defined by the European Computer Manufacturers Association)
- DOM 0 (Document Object Model)

Summary

Going forward, ATVEF membership provides any company involved in enhanced TV with a "voice at the table" to define cross-industry standards. ATVEF version 1.1 emphasizes interoperability and the delivery of enhanced content to the widest possible viewing audience. Appropriately, the ATVEF spec is receiving wide industry acceptance. For example, Intel is migrating Intercast technology to the ATVEF standard, and other ATVEF members are adopting the specification for their interactive TV offerings. The ATVEF specification is the foundation for new television content and adaptation of existing content. It is also used by broadcasters to help retool their head-end equipment. On the hardware side, the specification is helping developers create a new generation of set-top boxes and TV peripherals, including set-top DVD recording media planned for release in the year 2000. Tuning into the possibilities of ATVEF 1.1 is the best way to share the revolutionary potential of digital television.

More Info

Version 1.1 of the Advanced Television Enhancement Forum (ATVEF) Specification 1.1 is available at the ATVEF Web site.

Visit the ATVEF Web site for details about membership, upcoming events, and technical white papers.

The ATVEF specification is based on existing Internet technologies. To learn more about these technologies, visit the following Web sites. A more comprehensive list is included as an appendix to the ATVEF specification.

- Document markup language HTML 4.0
- Document scripting language ECMAScript
- Document Object Model DOM Level 0
- Hypertext Transfer Protocol (HTTP) 1.1 (RFC 2068)
- Data Delivery via Analog Video VBI: (Working Group)
- MIME multipart
- MIME HTML (rfc2110)
- Content description SDP
- Session Announcement Protocol (SAP)
- Audio/basic

Author Bio

Senior technical marketing engineer Steve Darrough is directly involved in Intel's Interactive Television efforts. His responsibilities include liaison with major U.S. broadcasters, including NBC, Viacom, Disney, ESPN, CNN, Lifetime Television, Home and Garden Television, QVC, PBS, and The Weather Channel. Steve has also worked to develop Intel® scheduling and insertion tools used for the delivery of interactive TV. Steve is a contributor to the ATVEF Forum, which has engaged in the advancement of baseline specifications for interactive television.

Mobile

New Processors Offer Performance and Mobility

Jeffrey L. Kataoka
Launch Manager/Channel Programs Manager
Mobile and Handheld Products Group
Intel Corporation

Overview

Intel's October 25 introduction of a sweeping array of new Intel® Pentium® III processors includes three processors designed specifically to meet the needs of the mobile computing marketplace. Available in 500, 450, and 400 MHz frequencies, the new mobile Pentium III processors provide developers with improved levels of performance and mobility, plus a wider range of choices than ever before to meet evolving end user demands.

As with all of Intel's new Pentium III processors, the three mobile Pentium III processors provide higher levels of integration and greater performance through Intel's advanced 0.18-micron process technology, as well as a 100 MHz processor system bus. In addition, the new mobile processors further accelerate performance through the incorporation of an Advanced Transfer Cache (ATC) and Streaming SIMD Extensions—features also common to Intel's new desktop, workstation, and server Pentium III and Intel® Pentium® III Xeon™ processors. New packaging and power features also distinguish the latest generation of mobile processors, which offer significant advantages when compared with their mobile Pentium® II predecessors.

The Next Generation of Mobile Innovation

Performance first. Comparisons between the previous-generation mobile Pentium II processor running at 400 MHz and the new 500 MHz version of the mobile Pentium III processor tell the story. Benchmark studies reveal a productivity boost of 23 percent and a multimedia application performance increase of 60 percent when comparing the two processors. Floating-point performance is a whopping 131 percent better, while Internet applications benefit by an impressive 54 percent increase.

When a mobile system with a Pentium III processor running at 500, 450, and 400 MHz is tested with business and consumer applications against a mobile PC with a mobile Pentium II processor running at 400 MHz, the performance of a mobile Pentium III processor is outstanding. Examine the Business and Consumer Applications performance chart (click on thumbnail graphic) and see how the mobile Pentium III processor performed against a mobile Pentium II processor.

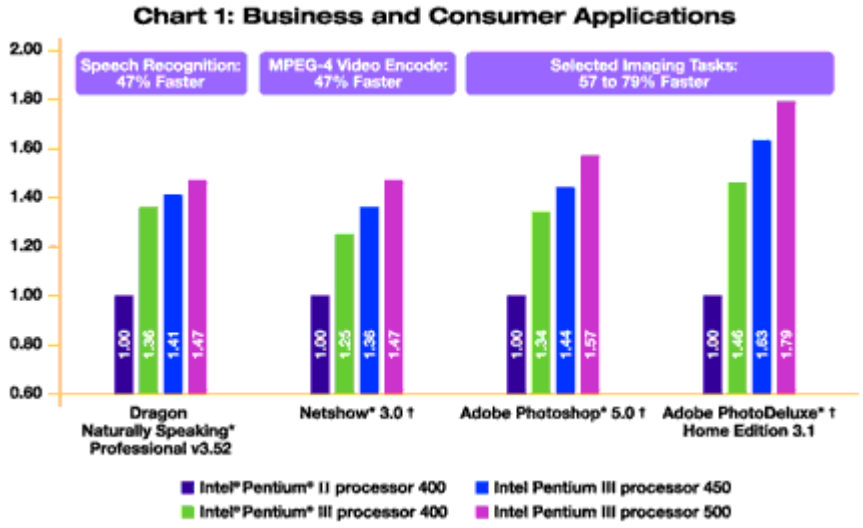

Chart: Business and Consumer Applications

Note: Intel® Pentium® II processor was tested in IBM Thinkpad* 770 with 256K of on-die L2 cache, 64 MB SDRAM, DVD ROM, 440BX chipset with processor system bus at 66 MHz, Trident* 9385DVD graphics, 8.1 GB HDD, DirectX* 7.00G, and Windows* 98. Intel® Pentium® III processors were tested in an OEM notebook which will be launched shortly, with 256K of on-die L2 cache, 64 MB SDRAM, DVD ROM, 440BX chipset with processor system bus at 100 MHz, NeoMagic* 2562X graphics, 10 GB HDD, DirectX 7.00G, and Windows 98.

This performance data is the result of a performance measurement utility created by Intel. The utility runs only portions of the applications it tests. The tested portions of the applications were chosen to highlight the benefits of the Streaming SIMD instructions of the Pentium III processor. The performance of these functions may not be representative of that of other functions of the applications, and may not be representative of your use of the applications.

† In addition, final versions of the applications were not available at the time of testing, so pre-release versions were tested. The released versions of the applications may be different from the versions actually tested. For all of these reasons, the actual performance you experience may vary. For more information on the performance measurement utility, see Performance Measurement Utility and the Performance Tests Web sites.

Best of all, this added performance has been achieved without compromising power. There's virtually no power increase at all when comparing the 400 MHz versions of both the Pentium II and new mobile Pentium III processors. And when compared with the 400 MHz Pentium II processor, the new 500 MHz Pentium III processor increases power by a paltry 15 percent while enhancing performance by as much 131 percent, as mentioned above.

In addition, innovations such as Intel® QuickStart technology conserve power during idle modes. While power usage may rise to about 10 watts during typing into an Excel spreadsheet, for example, QuickStart technology enables power usage to drop instantaneously to less than a half watt during the idle modes that occur between keystrokes. Beyond QuickStart technology, the battery life of the mobile Pentium III processors has been extended via 1.1V-1.6V mobile operating capabilities.

The processors also break new ground for mobility. Packaging is considerably smaller compared with the mobile Pentium II processor, with 0.18-micron micro pin grid array (PGA) and ball grid array (BGA) package sizes shrinking by 19 and 21 percent, respectively, compared with the 0.25-micron packages of the previous generation. The combination of higher integration, smaller packages and low power modes paves the way for thin and light notebooks that provide easier and more compact mobility for users on the go.

Summary

With this new product introduction, Intel is bringing all the benefits of the Pentium III processors to mobile PCs for the first time—and offering the best combination of performance, mobility, and choice. Whether running office applications, accessing the Internet or corporate Intranets, viewing high-quality video, or manipulating 3D images, new mobile Pentium III processor-based systems will offer the highest performance ever for Intel® Architecture-based notebooks.

Best of all, the introduction of the mobile Pentium III processors provide mobile platform developers with an unprecedented array of feature and price/performance options. The new processors extend the depth and breadth of the mobile platform to encompass full-size, “thin and light”, and even mini form factors, with a range of system price points spanning entry-level to high-performance mobile computing.

More Info

For more details, please visit these other Intel Web sites:

- Mobile Pentium III Processors
- Performance Measurement Utility
- Performance Tests

Author Bio

Jeff Kataoka is the co-launch manager/channel programs manager for the Mobile and Handheld Products Group at Intel Corporation. Jeff managed the launch of several new additions to the mobile Pentium® II processor, as well as, the Mobile Intel® Celeron™ processor. In addition to his processor launch function, Jeff manages the reseller channel marketing activities for the Mobile and Handheld Products Group. He has worked for Intel since 1996.

Prior to joining Intel, Jeff spent 16 years in the PC industry working for a computer manufacturer, as well as, some major distributors and national computer resellers. As marketing programs director at ComputerLand headquarters, Jeff was responsible for the development and coordination of marketing programs for the IBM, Hewlett-Packard, Apple Computer, Intel, and
Bay Networks product lines and managed supplier relations for these OEMs.

Jeff is a 1976 graduate of the University of California, Berkeley and received a Masters of Business Administration degree from California State University at Hayward in 1986.

Source: Intel. These performance numbers were obtained by testing and comparing a commercially available Pentium® II processor based mobile PC with a commercially available mobile Pentium® III processor-based mobile PC. The system configurations are the following:

OEM A, System 1 with a Pentium II processor with 256K of on-die L2 cache, 64MB SDRAM, DVD ROM, 440BX chipset with processor system bus running at 66MHz, Trident9385DVD graphics controller, 8.1GB hard disk drive, DirectX version 7.00G, Windows NT* 4.0 for SPECint95* and SPECfp95*, and Windows* 98 for all other benchmarks.

OEM A, System 2 with Pentium III processors 500, 450 and 400 MHz with 256K of on-die L2 cache, 64MB SDRAM, DVD ROM, 440BX chipset with processor system bus running at 100MHz, NeoMagic 2562X graphics controller, 10GB hard disk drive, DirectX version 7.00G, Windows NT* 4.0 for SPECint95* and SPECfp95*, and Windows* 98 for all other benchmarks.

Server

The Choice for e-Business Front-End Servers

Raejeanne Bohart
Pentium® III Xeon™ Processor
Product Manager
Enterprise Server Group
Intel Corporation

Overview

The latest Intel® Pentium® III Xeon™ processors, introduced by Intel on October 25, have been optimized to meet the needs of hardware and software developers in the expanding server marketplace. Available in 733, 667, and 600 MHz frequencies, the new 2-way processors are ideal for creating powerful, affordable, available, and long lived dual-processor front-end server solutions. With volume pricing, 2-way Pentium III Xeon processors allow developers to extend the scalability, headroom, and availability benefits found in existing Intel Pentium III Xeon processor based 4-way and 8-way systems to their 2-way front-end server solutions.

The introduction of these new processors provide the platform headroom and scalability required to keep up with the increasing demand and workload volatility of the new Internet economy. And the combination of the new 2-way processors and their existing 4-way and 8-way counterparts now provides developers with Pentium III Xeon processors capable of serving the needs of the vast majority of segments of the server marketplace.

Highly Available Platforms

The 2-way Pentium III Xeon processors build on the foundation of the new Pentium® III processor core technology, and extend the benefits of 4-way and 8-way Intel processors to front-end e-Business platforms. These new 2-way processors offer the same integrated manageability features that help to improve system availability for all Pentium III Xeon processor-based platforms. The new processors also incorporate on-cartridge voltage regulation, which provides improved availability as well as reduced platform costs for OEMs and system developers. And as with all Intel-based server platform solutions, the new processors support a broad range of operating systems and applications for flexible e-Business solutions.

Systems manufacturers can further increase the reliability, availability, and serviceability of the platform with features such as hot-swappable and redundant disks, power supplies, and fans or server clustering and fail-over technologies. Most importantly, the new Pentium III Xeon processors are available with volume pricing, to allow users to deploy the most available Intel® Architecture-based processors in their 2-way server platforms.

Platform Stability and Longevity

The new 2-way Pentium III Xeon processors feature outstanding price/performance and availability advantages to meet the needs of the connected enterprise, providing Pentium III Xeon processors technology at very affordable price points. In addition, the new Pentium III Xeon processors also feature an improved product life policy—twice that of desktop processors—to enable server manufacturers to extend the life of their platform solutions. Platform upgradeability helps pave the way for migration to future 2-way Pentium III Xeon processor-based server designs.

Extended Server Platform Performance

The latest members of the Pentium III Xeon processor family bring new levels of performance and more server specific features than ever before to front-end 2-way platforms. As with all of Intel's new Pentium III and Pentium III Xeon processors introduced on October 25, each of the new processors utilize the advantages of Intel's 0.18-micron high-volume manufacturing process technology, now in full production. Featuring a 256 KB Advanced Transfer Cache, 133 MHz system bus and faster frequencies, the 2-way processors provide peak performance for demanding e-Business computing. A large cache option, designed specifically for 2-way Pentium III Xeon processors, will be available in the future for maximum 2-way scalability and performance headroom. Server manufacturers can further boost headroom with robust memory and I/O capabilities, such as those provided by the new Intel® 840 chipset.

While the performance increase is notable, the real value proposition of the new 2-way Pentium III Xeon processors can be found in the headroom, scalability, platform longevity, availability, and affordability benefits they offer. Whether it's a 2-way, 4-way, or 8-way Pentium III Xeon processor-based platform that's required, developers and systems manufacturers can now create powerful and differentiated solutions at every rung of the server ladder.

More Info

For more details on Intel's Pentium III Xeon processors and associated server platform products, visit Intel® e-Business Center server solutions Web site.

Author Bio

Raejeanne Bohart is the Pentium III Xeon Processor product manager for Intel's Enterprise Server Group (ESG). She has worked at Intel for more than five years, holding positions in ESG and Intel's Worldwide Manufacturing Organization. Raejeanne holds a Bachelor of Science degree in computer science and mathematics from Pepperdine University, as well as a Masters in Business Administration from Marylhurst University.

Workstations

Raising the Workstation Performance Bar

PJ Landwehrle
Product Marketing Manager
Workstation Products Group
Intel Corporation

Overview

Faster, better, and able to provide real price/performance leadership for differentiated product offerings. That's the message underlying Intel's new Pentium® III and Pentium III Xeon™ processors' 733 MHz, which give Intel-based workstation developers the performance and scalability they need to build next generation platforms for running today's and tomorrow's powerful e-Business applications. Processor features such as the new Advanced Transfer Cache (ATC) and System Buffering, enhanced 133 MHz front-side bus, and Intel® Streaming SIMD Extensions pave the way for these workstations to create, design, analyze, and visualize the future.

But the new processors are just part of the total solutions approach Intel is taking in the workstation marketplace, as evidenced by the new Intel® 840 chipset—Intel's first chipset designed to meet the needs of the workstation platform. Based on Intel® Scalable Bandwidth Technology, the new chipset is also the industry's first solution to take advantage of Rambus high-speed RDRAM technology. In addition, the chipset supports AGP Pro, which paves the way for increased graphics performance by supporting either AGP 2X or AGP 4X. The result is an integrated and balanced platform solution that opens up a wealth of new possibilities for workstation developers.

A Workhorse for Workstations

Designed to meet the needs of high-performance multiprocessor systems, the Intel 840 chipset features RDRAM memory bandwidth of up to 3.2 gigabytes per second, advanced 64- and 32-bit I/O capabilities, and support for AGP Pro. The chipset consists of three components:

- The 82840 Memory Controller Hub (MCH) provides graphics support for AGP 2X/4X, dual RDRAM memory channels, and multiple PCI segments for high-performance I/O.
- The 82801 I/O Controller Hub (ICH) supports 32-bit PCI, IDE controllers, and dual USB ports, and utilizes the Intel® Accelerated Hub Architecture to connect directly to the MCH.
- The 82802 Firmware Hub (FWH) stores system and video BIOS, as well as an Intel® Random Number Generator that provides robust encryption, digital signing, and security protocols.

In addition to these three core components, the Intel 840 chipset features three optional components that can be used to scale performance. The 82806 64-bit PCI Controller Hub supports 64-bit PCI slots at speeds of either 33 or 66 MHz. And the 82803 RDRAM-based Memory Repeater Hub expands RDRAM memory capacity, while the 82804 SDRAM-based Memory Repeater Hub does the same to extend SDRAM capacity.

The Complete Workstation Solution

Not to be overlooked in the midst of Intel's processor and chipset introductions is the influence that AGP Pro will have on boosting the performance of workstation graphics. By providing flexible support for either AGP 2X or AGP 4X, AGP Pro paves the way for larger memory, faster geometry processors, faster rasterizers, and higher-resolution frame buffers—all of which enable developers to build robust platforms designed for the multimedia application needs of the Internet Age.

All these advantages support the new Pentium III and Pentium III Xeon processors 733 MHz, which incorporate Intel Streaming SIMD Extensions to enable the next wave of high-performance workstation applications. The SIMD Extensions consist of 70 new instructions that provide higher viewing resolution, better audio and video performance, and reduced CPU utilization for speech recognition. Add everything up, and it enables Intel-based workstation platforms to offer the processing power, chipset bandwidth, and high-performance graphics necessary to become the e-creation vehicles of choice for Internet computing.

More Info

For more details on Intel-based workstations, the latest generation of Intel's Pentium III and Pentium III Xeon processors, and the new Intel 840 chipset, visit the specific urls below:

- Intel e-Business Center Workstation Solutions
- Intel Architecture Processors
- Intel Chipsets

Author Bio

PJ Landwehrle is a product marketing manager in Intel's Workstation Products Group, where his responsibilities include overseeing marketing activities for Intel's workstation components, processors, chipsets, and product roadmaps. PJ graduated from the Air Force Academy in 1977 and holds an M.S. from Boston University in Computer Information Science and an M.S. from the Massachusetts Institute of Technology in Management of Technology. He joined Intel in 1998 after serving as an officer and fighter pilot in the U.S. Air Force for 20 years.

—End of Intel Developer Update Magazine Issue 2—